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Controls on Capital Flows and the Tobin Tax.

by

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International Economics

Center for Economic Studies
Discussions Paper Series (DPS) 00.02
http://www.econ.kuleuven.be/ces/discussionpapers/default.htm

February 2000

DISCUSSION PAPER

CONTROLS ON CAPITAL FLOWS

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I am grateful to Magdalena Polan for her efficient research assistance, to Margarida Abreu, Joseph Bisignano, Philip Davies, John Williamson and participants of the Conference "What Financial System for the Year 2000?", December 1999, organised by the ISEG - Instituto Superior de Economia e Gestão, Lisboa for their helpful comments.

1. Introduction

The financial crises of the 1990s have given a new impetus to proposals aimed at controlling international capital movements. Well-known economists came out in favour of such controls, giving (some of these) capital controls a new respectability[1]. In this paper we want to evaluate these proposals. In order to do so, it is important to distinguish between the different objectives that are pursued by those who propose capital controls.

These objectives are very diverse. The most important ones are the following:

- A reduction of "excessive" exchange rate variability.
- A source of revenue for worthwhile international projects (e.g. development aid).
- Giving the monetary authorities more autonomy in setting domestic interest rates.
- Stabilisation of an emerging financial crisis due to large scale capital outflows.
- Preventing excessive capital inflows when countries liberalise their domestic markets.

Some proposals for controlling capital movements have been aimed at several of these objectives. The best-known proposal in this category is the Tobin-tax. Other proposals have more narrowly defined objectives[2]. In this paper we analyse some of these proposals and evaluate their effectiveness in achieving their stated objectives.

2. The Tobin-tax

There is no doubt that the Tobin-tax has become the most popular proposal for controlling capital movements. Formulated more than twenty years ago by Tobin(1978), it wants to tax all transactions in the foreign exchange market at a fixed rate of, say, 1%. Such a fixed tax rate affects the rate of return of short-term investments considerably, while being of little importance for the rate of return on long-term investments. As a result, it discourages short-term capital movements (usually considered to be destabilising by the proponents of the tax) but keeps long-term capital flows relatively unaffected.

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[1] Examples are Barro(1998), Bhagwati(1998), Krugman(1999).

[2] For a survey see Dooley(1995) and more recently Ariyoshi, et al.(1999).

After a long life of neglect, the Tobin tax has gained a strong following recently. Few NGOs in the business of development aid have not taken the Tobin tax as one of their battle cries in the war against wicked international investors. French presidents have openly come out in favour of the Tobin tax.

As stated earlier, the Tobin tax has been proposed to achieve several objectives. We will focus here on two of these objectives, i.e. the reduction of exchange rate variability, and the creation of revenue for international projects[3]. We will return to the other objectives in the next sections where we compare other proposals for controlling capital movements with the Tobin tax.

2.1 The Tobin tax and exchange rate variability

The case for a Tobin tax to achieve a lower degree of exchange rate variability is based on a simple view about how the foreign exchange market works. The most elegant presentation of this view has been made by Frankel(1996) in an influential article. Consider two classes of investors, short-term and long-term. When forecasting the exchange rates the short-term investors extrapolate past movements. As a result, they tend to reinforce upward or downward movements of the exchange rates, thereby destabilising the market. The long-term investors, however, compute the fundamental value of the exchange rate when making forecasts. If the present exchange rate is above (below) the fundamental value they will expect it to return to its fundamental value. The expectations of long-term investors are therefore regressive. This stabilises the foreign exchange market.

A Tobin tax will discourage the short-term capital movements much more than the long-term capital flows, for the reason given earlier. As a result, the long-term investors will tend to dominate the market, and therefore also their stabilising actions.

In order to justify his modelling approach Frankel invokes empirical evidence indicating that short-term forecasting in the foreign exchange market has a strong extrapolative component, while long-term forecasting tends to be regressive. So far so good.

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[3] In his initial proposal, Tobin considered the monetary autonomy objective as the most important one. We will analyse this objective in section 6.

There are poblems with this view, however. To analyse the problems, let us start from an empirical puzzle. Since the early 1980s the industrial world has experienced a strong liberalisation of capital flows. This has led to fantastic expansion of daily flows in the foreign exchange markets. This increase has been mostly at the short-end of the capital flows. Despite this fantastic increase in the size of these flows there is no evidence that exchange rates among major currencies have become more variable. Table 1 illustrates this phenomenon. We show measures of exchange rate variability during three decades, the 1970s, the 1980s and the 1990s. We find that there is practically no difference in the degree of variability of exchange rates during these three decades. In fact we find a slight decline in the degree of exchange rate variability during the 1990s compared to the 1980s. These differences, however, are too small to be significant. Thus it is safe to conclude that the greater degree of capital mobility achieved during the 1990s does not seem to have led to greater exchange rate variability.

Table 1: Measures of exchange rate variability

	Standard deviation of monthly changes			Mean average monthly changes		
	DM/$	Yen/$	£/$	DM/$	Yen/$	£/$
1970s	3.5	3.2	2.8	2.5	2.0	2.1
1980s	3.6	3.5	3.6	2.9	2.8	2.8
1990s	3.3	2.9	3.5	2.4	2.3	2.5

Source: P. De Grauwe, International Money, 2nd ed, Oxford University Press
Note: The 1970s span the period 1973-79 of floating exchange rates; the 1990s relate to 1990-96.

The puzzle therefore is the following. If the Frankel model is a good representation of reality one would have expected that the gradual dismantling of controls on capital movements in the world and the ensuing explosion of short-term capital flows would have led to increasing instability of the exchange rates. This did not happen. What could be the reason?

One possible explanation is that the monetary authorities may have stepped up their interventions in the foreign exchange markets. There is, however, no evidence for this. The major central banks do not seem to have intervened more frequently in the dollar exchange markets during the 1990s as compared to the 1970s and 1980s.

The problem with the Frankel model is that it fails to account for an important institutional feature of the foreign exchange market: this is a multi-dealer market in which the largest part of the daily transactions are done for purposes of hedging and not of speculation. It has been estimated that 80% of the daily flows represent hedging activities of dealers ("hot-potato trading")[4]. Thus, the Tobin tax will discourage short-term speculators and short-term hedgers. Since the latter are responsible for (by far) the largest part of the market transactions, it is not obvious that the reduction of hedging activity will tend to reduce the exchange rate variability.

We have to look into the "micro-structure" of the foreign exchange market to give an answer to the question of how the reduction in the size of hedging activities will affect the variability of the exchange rates. This micro-structure model can be described as follows[5].

Suppose an individual speculator buys dollars (sells euro), thereby raising S (the price of dollar in units of euro). If there are no dealers, the speculator must find another trader willing to hold the euro. In order to find a risk avert trader to hold all these euros, the price of euros will have to drop a lot.

With many dealers we have a different situation. Let us assume a chain of dealers. The first dealer obtaining the euros will want to unload them, but not the full amount. Because of the drop in the price of the euro the dealer has an incentive to hold a fraction of these cheap euros. Suppose, he holds 5%. He then unloads the other 95% to another dealer, who has the same incentive to hold a fraction and to unload the rest. (This is the hot-potato trading). At the end of the line all the dealers hold a fraction of the initial net speculative demand. (Note that the chain will typically be shorter because a speculator is likely to be found to buy the remaining fraction of the euros at the given price). Since each (risk averse) dealer holds only a fraction of the initial order flow, he will be willing to do this accepting a smaller price decline of the euro than if any one of them had to hold the full order flow. Thus when there are many

[4] See Lyons(1999) on this.

dealers, the price decline of the euro needed to absorb the initial order flow will be smaller than if there are no dealers[6].

The previous analysis can also be formulated as follows: The existence of many dealers is a mechanism that allows to spread risk more efficiently. When a speculator buys dollars (sells euros) he forces somebody to take the counterparty risk. When there are many counterparties this risk can be spread around more efficiently.

If one accepts this reasoning one comes to the conclusion that taxing all transactions in the foreign exchange market also makes this search for risk spreading more difficult. As a result, it is not certain at all that exchange rates will move less. They could be moving more.

Note that the Tobin tax will discourage hedging in the foreign exchange market more than pure speculation. The reason is that the search for risk spreading involves multiple transactions in the foreign exchange market. For example, assume that the initial sale of euros is 100. Each dealer keeps 5% until, say, after five dealers the rest is unloaded to another speculator willing to take a reverse position. The chain of taxes (assuming a Tobin tax of 1%) will be

100*0.01[1 + *0.95 + *(0.95)^2 + *(0.95)^3 + *(0.95)^4]

Thus hedging will be taxed by a multiple of the Tobin tax. In this simple example the hedging activities are taxed at a rate of 4.5%. This must have effects on the structure of the market. It is likely to eliminate the multi-dealer nature of the market and to favour its centralisation, like the one that exists in the stock markets. Such a centralisation then becomes another substitute for the efficient spreading of risk.

This change in the market structure will have several implications.

- As the market becomes more centralised the battle to attract this market will be strong. This will create strong incentives for countries not to apply the Tobin tax, so as to lure the market. The practical implementation will be made even harder than it is today.

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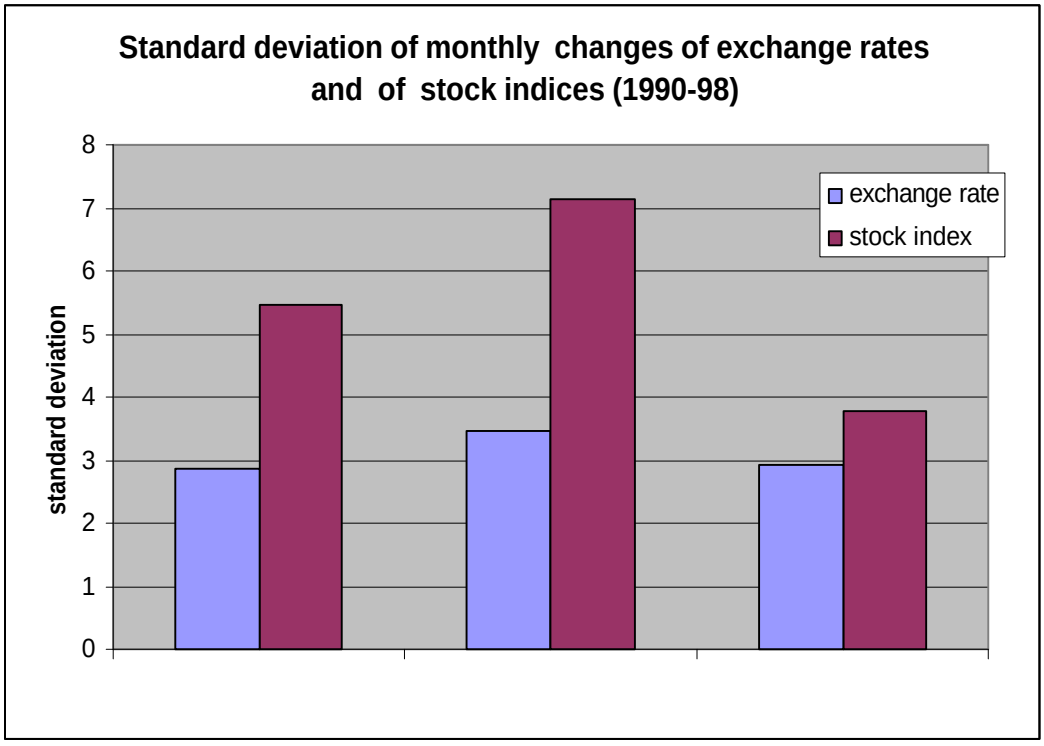
[5] For a formal analysis see Lyons(1999)

[6] Note that this argument is based on the concavity of the utility function: risk premia increase with increasing positions in a particular currency.

- It is unclear whether a more centralised market leads to less variability of prices. The evidence seems to go in the other direction. Centralised asset markets experience more price variability. We show some evidence in the figure 1. We present the monthly variability of the dollar exchange rates and compare this with the monthly variability of the stock price indices in the corresponding countries[7]. We observe that the variability of stock prices (centralised markets) was significantly higher than the variability of the exchange rates (multi-dealer markets) during the 1990s. There could, of course, be other reasons why we find this. But this observation is also consistent with the view that the multi-dealer markets have inherent characteristics tending to reduce price volatility.

Figure 1:



Source: IMF, IFS and Reuters
Note: The exchange rates are $/DM (Germany), $/yen (Japan) and DM/$ (US).

- The change in the market structure will lead to large reductions in the size of the daily transactions as the multiple dealer market disappears. This will have

[7] Note that we use stock price indices. In general these show less variability than the underlying stock prices.

repercussions for the second objective of the Tobin tax, i.e. the collection of revenue for international projects.

2.2 The Tobin tax and revenue raising

The previous analysis suggests that the calculations that have been made of the revenue effects of the Tobin tax are vastly exaggerated. The prospective revenues of the tax are likely to be much smaller than commonly thought. To get an impression, consider that today 80% of the market represents inter-dealer trading. As argued earlier, the Tobin tax would severely hit this portion of the market, so that a large part of this inter-dealer trading would tend to disappear. This could easily reduce the daily turnover by more than 50%. If, as a result of the Tobin tax, the FX-market evolves into a centralised market, the daily turnover could shrink to one fifth of its present size. One can conclude that most of the estimates of the potential revenue of the Tobin tax are vastly overestimated. The reason is that these calculations do not take into account the likely effects of the tax on the market structure. And these effects are likely to be profound.

3. Capital controls to manage exchange and banking crises.

The recent financial crises in Asia have opened up a new avenue for the use of capital controls[8]. There is now a large consensus among economists that, at least in some Asian countries, the crisis had some essential ingredients of a classical bank run. Its characteristics were the following. Large perceived rates of return in Asian countries attracted sizeable amounts of foreign capital. These foreign investors, however, maintained their claims on the banks of these countries in a liquid form. The latter then transformed their short-term (foreign currency) liabilities into long-run (domestic currency) assets. The local banks were therefore cumulating a liquidity risk (a normal risk banks take) with a currency risk (a risk banks usually avoid). The former risk can usually be reduced to a minimum in modern nations where the central bank operates as a lender of last resort. The latter risk can be covered only very

[8] For a recent convert see P. Krugman(1999). See also Bhagwati(1998). Older proposals in this connection were formulated by Eichengreen and Wyplosz(1993) in the context of the EMS-crises.

imperfectly by the central bank. The capacity of the latter to cover the currency risk of the domestic commercial banks depends on the size of the central bank's international reserves and its international creditworthiness.

Thus, the combination of liquidity and currency risk taken by the commercial banks severely limited the lender of last resort function of the central banks, and made the commercial banks susceptible to classical banks runs such as those experienced before the central bank became a lender of last resort[9].

It is in this context that controls on the outflow of capital can be interpreted as a logical extension of the central bank's role of lender of last resort in a system in which banks take a foreign exchange risk. When foreign investors, driven mainly by panic, suddenly withdrew their deposits from Asian banks, they precipitated a banking crisis that the central bank could not deal with. The latter could have stopped supporting the exchange rate. But in that case the failure of a large part of the banking system would be a certainty (given the currency risk this system had taken). At the same time the continuing support of the exchange rate was just an invitation to the foreign investors to cash in their deposits. The central bank typically did not have the means to satisfy all these investors, and thus would have to abandon the peg, leading to the same collapse of the banking sector. The sensible way out of such a dilemma is to invoke a standstill. Foreign investors agree to maintain their credit lines until the "dust settles". In fact it is in their interest to do so, but collective action problems prevent this from happening on a voluntary basis. The use of controls on capital outflows is a way to resolve this collective action problem. By introducing controls, the central bank implements a standstill, and allows for a resolution of the liquidity crisis.

Thus, there is a good argument to be made for controls on capital movements. It should be stressed, however, that the argument only justifies temporary controls, not a permanent fixture.

Second, the argument for controls is a second best argument. The need to introduce capital controls arises because the supervision of banks is weak, leading them to take excessive risks. If the supervision is strengthened the need to resort to capital controls is reduced.

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[9] See Eichengreen(1999), Dornbusch(1998) and Goldstein(1995) on these issues.

Third, capital controls as an instrument for a standstill in a banking crisis creates all the problems of moral hazard. But this is no different from the moral hazard created by the lender of last resort.

Finally, it should be stressed that the Tobin tax is not a good instrument to deal with banking and liquidity crises. A constant tax rate will not prevent investors who panic, from drawing down their deposits. Only emergency measures like temporary prohibitions to export capital can work in stemming the tide.

The previous discussion is also predicated on the existence of fixed exchange rates. It has been argued that the pegging of the exchange rates by Asian countries lured the banks to take excessive risks. Without the fixed exchange rate commitment of the central banks it is quite unlikely that the commercial banks would have taken the large currency risks. Thus, the need for temporary controls on capital outflows may be said to exist only when countries peg their exchange rates.

4. Capital controls in the transition towards liberalisation

It is increasingly recognised that something went wrong with the timing of the liberalisation of capital flows in Asia during the 1990s. Under pressure from international organisations, a number of Asian countries started to dismantle their system of controls on capital inflows in the early 1990s. This happened while major segments of the financial markets maintained large distortions. This led to large misallocations of foreign capital in projects whose prices did not reflect the true risk. One such distortion arose from the fact that domestic banks profited from, mostly implicit, deposit insurance, while the supervision and the prudential control of these banks was not, or only poorly, organised. This created strong moral hazard and excessive risk taking. The sudden freeing of capital inflows exacerbated the effects of these pre-existing distortions and drastically increased systemic risk in these countries (Mishkin(1998)).

This idea is nothing but an application of second-best theory, which states that the elimination of distortions in one market while keeping the distortions in other markets unchanged, may decrease welfare. In order to increase welfare, all distortions should be eliminated. If this is not possible, one should not remove distortions partially. The practical implication of this view is that as long as Asian countries are

not able or willing to remove the distortions in their domestic markets, it is probably better to keep some control on capital movements[10].

As in the previous case this argument calls for the use of capital controls as a *temporary* measure, not as a permanent one. The logic of this conclusion cannot be emphasised enough. Trade and finance are increasingly linked. A country that is opening up its goods markets is sooner or later confronted with the need to also opening up its financial markets. In a world in which competition is intense the use of best-practice financial techniques becomes an important factor in the competitiveness of nations. In the long run countries cannot fully enjoy the benefits of trade if they maintain closed financial markets. In this sense capital controls cannot be a permanent feature of countries that integrate themselves in the world economy.

5. Long-run erosion of capital controls

It has long been recognised that controls on capital movements are increasingly evaded as time goes on. As a result, the effectiveness of a given set of capital controls diminishes over time. This phenomenon has been well-documented in the literature (see Gros(1987)). The reasons for this erosion are twofold. First, asset markets are fluid. Obstacles erected against the movements of financial assets leads clever market operators to find or to create other circuits for doing the same transactions. One of the best known historical examples is provided by the US "interest equalisation tax" of the 1960s (a Tobin tax *avant la lettre*). The effect of this tax was to displace a significant portion of the US-banks activities to offshore centers, especially to London. As result, the US interest equalisation tax contributed to the development and the spectacular expansion of a whole new market. As a corollary, it became increasingly ineffective and was abolished.

Similar effects are likely to arise if the Tobin tax were introduced now. To give an example, consider the swap market. A foreign currency transaction can be replicated by a combination of a currency and interest rate swap, thereby largely evading a transaction in the foreign exchange market. Let us take an example to clarify this point. Suppose a German investor buys $1 million in the spot market to profit from

[10] This idea has been influential in the setting-up of the Chilean control system. For an evaluation see Edwards(1998) and Neely(1999).

an expected rise in the dollar within six months. After six months he reaps his profit of say 10% by selling the dollars back into German mark. If a Tobin tax of 1% applies his net profit will be $100,000 - $20,000 = $80,000. (Note that our speculator pays the tax (1% of $1 million) twice, once when he buys dollars spot, and the second time when he sells his dollars six months later).

Consider now what would happen if the German investor used the swap market. He could then swap a German Government bond for a US Treasury security. This currency swap would typically be a combination of a currency and an interest rate swap, but we leave the interest swap out of the picture here. At the moment of the swap no transaction occurs in the foreign exchange market. In fact, no cash transaction occurs at all since the two parties only promise today to transfer the net profit resulting from a change in the exchange rate at the end of the period. Only at that moment a cash transaction occurs. Thus, if after six months the dollar has appreciated by 10% our German investor obtains a net settlement of $100,000. He then sells this in the foreign exchange market and pays a Tobin tax of 1%. His after tax profit then is $99,000 which compares with $80,000 if he speculates in the traditional way. It is clear that under those conditions most speculative activities will be done through the swap market. This also means that the Tobin tax will have to be extended to the swap market, if it is to maintain some semblance of effectiveness. The obstacles to doing so, however, are formidable. The main reason is that it would not be sufficient to tax the nominal value of all currency swaps, but also the nominal value of all interest rate swaps. If only the currency swaps would be subject to the tax, new financial instruments would be developed whereby the exchange rate movements would be lodged into interest rate differentials. In other words currency and interest rate swaps cannot easily be separated for the purpose of taxation.

We conclude that development of new financial instruments would make it easy for speculators to evade most of the Tobin tax. As a result, traders (exporters and importers) who need to go through the foreign exchange market would bear most of the burden of the tax. This can hardly be the objective of such a tax. For the Tobin tax to be effective in a world of sophisticated financial markets these markets would have to be taxed (or regulated) as well. In other words, financial markets today are linked together in many intricate ways, mainly through the derivative markets. Taxing just one segment of these markets (the foreign exchange market) is not going to be

effective because most of the services provided by this segment can be provided in other ways. As a result, in order to be effective, the Tobin tax requires a re-regulation of the financial markets of the industrial countries. This would be a step back of twenty years.

6. The Tobin tax and monetary autonomy

In his original proposal, Tobin envisaged the tax to provide the authorities of a country *on a fixed exchange rate* with a greater liberty to set domestic interest rates[11]. This can be seen by using the interest parity condition. In fig 1 we apply this assuming a Tobin tax of 1%. The upper line defines the domestic interest rates (at different maturities) above which it is attractive for foreign residents to invest in domestic assets (given a foreign interest rate of 10%). The lower line defines the domestic interest rates below which it becomes attractive for domestic residents to invest in foreign assets. The band between the two then defines the levels of the domestic interest rates that will not lead to inflows or outflows when a Tobin tax of 1% applies. It can be considered to be a band of domestic interest rate freedom for a country on a fixed exchange rate.

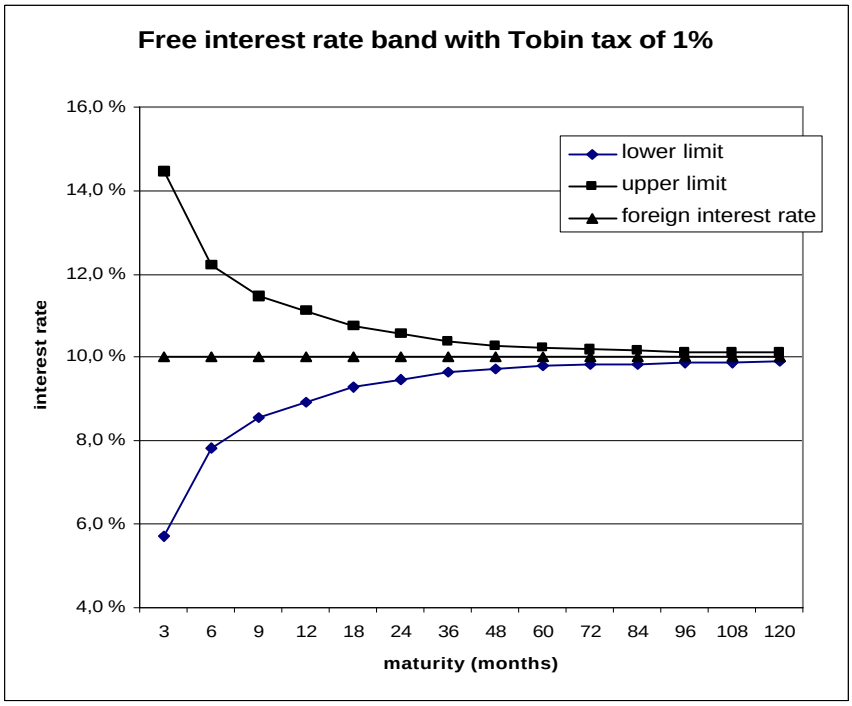
Figure 1 leads to the following insights. A Tobin tax provides a lot of freedom in setting short-term interest rates. For example, with a Tobin tax of 1% the authorities can set the three-month interest rate between 5.7% and 14.5% without triggering capital movements. This freedom of action declines rapidly, however, with the matuith of the interest rates. For two-year interest rates the band has narrowed to 9.5 - 10.5% and for five-year interest rates to 9.8 - 10.2%. For longer maturities this band of interest rate freedom practically disappears.

One can conclude that the interest autonomy provided by the Tobin tax is severely restricted. It exists only at the short end of the maturity structure, and is almost non-existent at the long end. It is difficult to see what the authorities can achieve by setting the short-term interest rates more or less freely if this freedom cannot be used to affect the long term interest rate (which matters for investment). The latter is almost 100% determined by the foreign interest rate.

[11] A country on a flexible exchange rate regime can have freedom in setting domestic interest rates without the use of the Tobin tax.

It is often argued that the wide band of freedom at the short end of the maturity spectrum allows the authorities to protect the domestic money markets from short-term speculative capital movements. However, this is largely an illusion. For example the band of 5.7 - 14.5% on three month assets allows the domestic authorities to protect themselves against a speculative expectation that the currency will be devalued by 1% or less. For any expectation of a devaluation exceeding 1% the Tobin tax will not give any protection. We argued in section 4 that other forms of control are then called for.

Figure 1:



7. Conclusion

The Asian crisis has not only affected the livelihood of millions of people, it has also changed the preconceptions of economists about the use of controls on capital movements. A new consensus seems to emerge seeing capital controls as useful instruments in two situations. First, capital controls can be defended as an instrument to organise a "standstill" when the sudden outflow of short-term capital creates a banking and liquidity crisis. Second, capital controls can be useful to shield domestic financial markets from too large inflows of capital when these markets are not yet perfectly liberalised.

It should be stressed that these two arguments for capital controls are really arguments for temporary controls. Countries that desire to integrate themselves in the international economy, sooner of later will have to open up not only trade but also their financial markets. The reason is that trade and finance are increasingly interconnected, so that achieving competitiveness in trade cannot be dissociated with the use of best-practice financial arrangements.

The fact that there are good arguments for some forms of controls on capital does not mean that all controls on capital movements have now become acceptable. We argued in this paper that the Tobin tax is a particularly bad idea. It will not achieve its main objective, which is the reduction of exchange rate variability. If implemented, it will drastically change the structure of the foreign exchange market away from a multi-dealer towards a centralised market. This may lead to more rather than less exchange rate variability. In addition, the change in market structure that would follow the implementation of the Tobin tax would dramatically reduce the size of the market, thereby also dwarfing the estimates of what a Tobin tax could generate as revenues for worthwhile international projects. Finally, in order to be effective it would require a re-regulation of the financial markets of the industrial countries.

The comparison of the Tobin tax with other forms of controls of capital movements allows us to highlight other important differences that have to do with their practical implementation. The Tobin tax is an instrument to permanently control worldwide capital movements. The latter involve mainly the flows between highly sophisticated financial markets. These two components (worldwide and involving highly sophisticated financial markets) make it impractical. The other controls that we

discussed in this paper involve individual countries that typically have less sophisticated financial markets. Their practical implementation therefore is not questionable.

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